

Information

The Outlook for Patients With Severe Acquired Valvular Aortic Stenosis

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ACCURATE INFORMATION concerning the true natural history of patients with severe acquired valvular aortic stenosis has been difficult to obtain. This is the case not only because in recent years operation frequently has interrupted the natural course, but also because the advent of means for the accurate assessment of the severity of stenosis by left heart catheterization is a relatively recent development. Before recommending operation in adult patients with valvular aortic stenosis, it is clearly of great importance to understand the natural history of this disease, so that the outlook in patients medically managed may be compared with that offered by surgical treatment. Adding to the importance of such a consideration are the particular problems of sudden death in patients with this disease and the continued relatively high mortality and morbidity associated with aortic valve replacement.

The advanced age at death of patients with severe acquired aortic stenosis has been a consistent feature in postmortem studies of patients with this disease. About three quarters of such patients are males and their average duration of symptoms is short, a history of angina pectoris having been present for an average of three years, syncope for three years, and congestive heart failure for a year and a half to two years (Table 1).¹⁻⁵

This pattern, a long latent period, followed by

onset of symptoms during the fifth or sixth decades of life, presumably reflects progressive aortic stenosis due to thickening and calcification of a congenitally or rheumatically deformed valve, progressive myocardial dysfunction related to the long-standing mechanical overload, or both. Once significant symptoms of angina, syncope, or heart failure develop, the average course is short, culminating in death at an average age of 63 years.⁵

The problem of sudden death deserves special consideration relative to the outlook of patients with aortic stenosis. Among patients dying with acquired valvular aortic stenosis, death was sudden in 15 to 20 percent and occurred at an average age of 60 years.^{1,4,6,7} Sudden death tended to occur in patients with symptoms, and 65 to 80 percent of patients coming to autopsy after sudden death had a history of angina pectoris, heart failure, or syncope.^{1,6,7} Thus, it should be emphasized that only 3 to 5 percent of the deaths in patients with acquired aortic stenosis occur suddenly in patients who have no significant symptoms. In connection with angina pectoris, it should be noted that 12 to 20 percent of patients with aortic stenosis who suddenly die have evidence at postmortem examination of old or recent myocardial infarction.

When data are summarized from clinical rather than postmortem studies, the patients have been encountered somewhat earlier in their course, their average age being 48 years. In the clinical reviews published prior to 1955, that is, before the hemodynamic and the surgical era, symptoms were present in the great majority of patients (Table 1). The most common complaint was angina pectoris, the average duration of which was five years, and in only 5 percent of patients was angina pectoris of long duration (ten to twenty years). The average incidence of syncope was 15 percent. Although the history of syncope averaged three to four years, the range was generally wide, and this symptom was present in some patients for as long as 18 years. A long range of symptoms related to left heart failure was unusual, its duration averaging only two years at the time the patients came under observation.¹

The few available prospective studies tend to confirm these relatively short clinical histories (Table 1). Grant, in 1933, reported that 65 percent of symptomatic patients with aortic stenosis,

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TABLE 1. Acquired Valvular Aortic Stenosis. Course Without Operation

| | Average Age (Years) | Average Duration History, (Years) | | | Clinical Follow-up | Duration (Years) | % Known Dead |
|---|------------------------|--------------------------------------|---------|------|---|---------------------|-----------------|
| | | Angina | Syncope | CHF* | | | |
| Post-mortem Studies (1933-1961) | (Death) 63 | 3 | 3 | 1½-2 | | | |
| Clinical Studies (Patients with symptoms, 1934-1966) | (First seen) 48 | 5 | 1-18 | 2 | Grant ¹⁰ 1933 Wood ¹¹ 1958 | 10 1-7 | 65 50 |

*CHF=Congestive Heart Failure

some of whom had associated aortic regurgitation, were dead at the end of ten years.¹⁰ More recently, in 1958, Wood¹¹ described 64 patients who were considered clinically to have severe aortic stenosis, but who were not subjected to operation, and who were followed for periods of one to seven years. Half were lost to follow-up, but 56 percent of the remaining 32 patients died during the period of observation. Takeda and coworkers followed 60 patients after their admission to the hospital with a diagnosis of isolated aortic valve stenosis; 82 percent were dead after four to fifteen years.¹²

Before turning to a consideration of results of cardiac operations in patients with aortic stenosis it is worthwhile to consider further the outlook for patients with severe aortic stenosis in whom the lesion has been documented objectively by hemodynamic means. Recently, a study was undertaken at the National Heart Institute to gain follow-up information on patients studied by left heart catheterization before the advent of the ball-valve prosthesis, in whom the clinical course was not interrupted by operation. During the past 14 years, a group of 15 such patients with severe valvular aortic stenosis were studied in whom a long follow-up could be obtained.¹³ Some patients refused operation, others were considered too ill at that time for operation, and, in some, symptoms were not sufficiently severe to warrant operation. When these patients were first seen their ages ranged from 32 to 59 years; there were 12 men and 3 women. All had significant aortic stenosis, with a pressure gradient between left ventricle and brachial artery of more than 50 mm of mercury, or a valve orifice area index ≤ 0.70 square centimeters per square meter of body surface area, or both. No associated mitral valve disease was detected nor was there significant aortic regurgitation in any patient. The 15 patients were followed for periods up to 12 years after initial hemodynamic study. Average age at onset of symptoms was 48 years,

TABLE 2. Acquired Valvular Aortic Stenosis. Operative Results (Valve Replacement)

| Follow-up | Average Mortality (percent) | | | Average Results, Survivors* | |
|-----------------|-----------------------------|---------|------------------------|--------------------------------|---|
| | Early | Late | Total | (Percent) | |
| 1 to 5 Years | 4 to 20 | 4 to 14 | 16 to 30 Average 23 | 85 Good | 15 Poor (emboli, **AI, symptoms) |

*From National Heart Institute.
**AI=Aortic insufficiency.

and the average life expectancy after the onset of symptoms was less than four years. Ten of the 15 patients were dead at the end of the follow-up period. There were no hemodynamic differences between the patients who survived and those who died, and there were no important differences in the incidence of symptoms in the survivors and non-survivors. At the end of four and a half years 50 percent of the patients were dead, and at the end of eight years 80 percent of those followed were dead. It also is of interest that the clinical course after the onset of angina pectoris, syncope, or heart failure in each of the patients who died was not influenced by the age at which the symptoms began, being rapid at any age.

Given these general facts concerning the prognosis of patients with acquired aortic stenosis treated medically, it is possible to consider the results of more recently developed surgical methods, and to develop a reasoned approach concerning recommendation of operation in patients with this disease.

The initial results with surgical replacement of the aortic valve with a ball-valve prosthesis or aortic valve homograft in several large centers are summarized in Table 2.¹⁴⁻¹⁸ In patients preoperatively in Classes II to IV of the New York Heart Association classification who have been followed postoperatively for periods of eight months to four years, the hospital mortality has averaged 23 percent. In the surviving group, the

results have been listed as poor in an average of 12 percent of patients, peripheral emboli having occurred in 9 to 15 percent of patients. In more than 80 percent of the survivors, however, the clinical result has been described as good or excellent. A representative operative series from the National Heart Institute of patients with isolated aortic valve disease (aortic stenosis and/or regurgitation) in whom a Starr-Edwards prosthesis was inserted may be considered in somewhat more detail. This series included 133 patients operated upon and followed during a four year period (1963-1967).¹⁹ The operative mortality was 16 percent, and the late mortality 15 percent. All of the surviving patients were improved. Before operation, approximately one quarter of the patients were in New York Heart Association functional Class II, while the remaining three quarters were in Classes III or IV. Postoperatively, more than three quarters of the patients were in functional Class I and of the 112 patients who survived, almost all have so far gained approximately two years of Class I or II existence.¹⁹ Hemodynamic studies tended to corroborate the clinical improvement, the average gradient preoperatively from left ventricle to aorta being approximately 95 mm of mercury in patients with aortic stenosis and postoperatively less than 20 mm of mercury. The late mortality (15 percent) following discharge from the hospital included sudden death in eight patients, coronary artery emboli in two patients, bacterial endocarditis in one patient, ball variance in three patients, and several other miscellaneous causes. An initial important cause of morbidity and mortality, thromboembolism, has been reduced by anticoagulation, as well as by the recent development of a fabric covered prosthesis that allows ingrowth of autologous tissue.²⁰ As in patients not operated upon, however, the problem of sudden death remains a serious cause of mortality in patients with aortic prosthetic devices.

It may be concluded from the above analysis of natural history and the results of surgical treatment in patients with acquired aortic stenosis that when significant symptoms develop the immediate outlook is poor, but it can be improved substantially by replacement of the diseased aortic valve with a prosthetic valve. Thus, the risk of operation itself and the late postoperative mortality combined (about 20 percent) are lower over a four to five year period in such

patients than the risk of non-operative treatment (about 50 percent). In addition, the symptomatic improvement in most of the survivors of operation has been considerable, many having been offered several years of relatively normal existence. Although it is clear that when the degree of stenosis as documented by left heart catheterization is not severe, operation should not be recommended, the problem of whether or not to recommend operation in patients with severe stenosis who have few or no symptoms remains unsettled. Since it is unknown whether or not the mortality and complication rates observed during the first few years after valve replacement will continue at their current trend, and since prospective studies are not yet available on the prognosis for patients with severe stenosis but few or no symptoms, it seems wisest, for the present, not to recommend operation in such patients. Detailed analysis of long-term studies concerning operative results are now in progress, and it may be hoped that these and other prospective studies will clarify these issues.

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